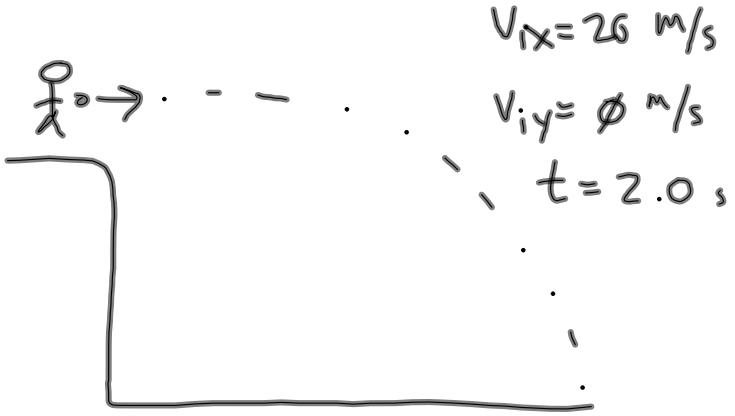
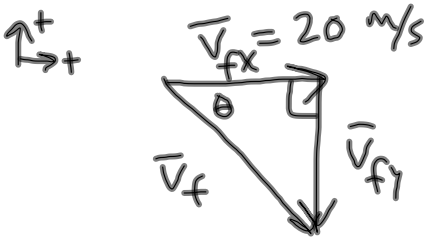
HW 5 #46:



a) show that final velocity = 28 m/s



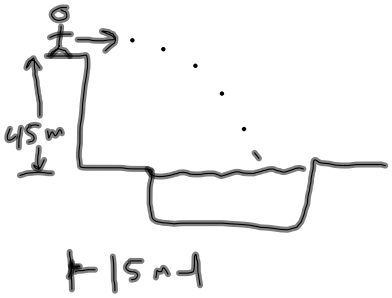
$$V_{fy} = V_{iy} + a_g t$$
$$= (-9.8\ m/s^2)(2\ s)$$
$$= -19.6\ m/s$$

$$V_f^2 = V_{fx}^2 + V_{fy}^2$$
$$V_f = \sqrt{(20\ m/s)^2 + (-19.6\ m/s)^2}$$
$$= 28\ m/s$$

b) at what angle does ball hit ground?

$$\tan\theta = \frac{V_{fy}}{V_{fx}}$$
$$\theta = \tan^{-1}\left(\frac{19.6\ m/s}{26\ m/s}\right)$$
$$= 44.4°$$

#42:



find t → jumping horizontally, so $v_{iy} = 0\ m/s$

$$\Delta y = v_{iy}t + \frac{1}{2}a_g t^2$$

$$t = \sqrt{\frac{2\Delta y}{a_g}}$$

$$= \sqrt{\frac{2(-45m)}{-9.8\ m/s^2}}$$

$$= 3.03\ s$$

find v_{ix}:

$$\Delta x = v_{ix}t$$

$$v_{ix} = \frac{\Delta x}{t}$$

$$= \frac{15m}{3.03\ s}$$

$$= 4.95\ m/s$$